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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/943,535	08/30/2001	Graham Andrew Cairns	YAMAP0777US	9423
7590	12/16/2003		EXAMINER	
Neil A. DuChez RENNER, OTTO, BOISSELLE & SKLAR, LLP 1621 Euclid Avenue, 19th Floor Cleveland, OH 44115			LAO, LUN YI	
			ART UNIT	PAPER NUMBER
			2673	
			DATE MAILED: 12/16/2003	

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	09/943,535	GRAHAM ANDR
	Examiner Lao Y Lun	Art Unit 2673

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

**A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.**

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) Responsive to communication(s) filed on 05 November 2003.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 17-40 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-16 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
 a) The translation of the foreign language provisional application has been received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                           | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5 . | 6) <input type="checkbox"/> Other:  |

***Election/Restrictions***

1. Applicant's election without traverse of Group I(claims 1-16) in Paper No. 7 is acknowledged.

***Specification***

2. The disclosure is objected to because of the following informalities:  
The recitations of "claims 1 to 16" on page 8, line 3 and " claims 17-40" on page 10, line 23 should be deleted since the claim numbers may be changed or cancelled later by applicants.  
Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:  
A person shall be entitled to a patent unless –  
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
4. Claims 1-3, 6, 9 and 12-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Okumura et al(5,844,534).

As to claims 1-3, 6, 9 and 12-16, Okumura et al teach an active matrix liquid crystal display comprising: a multi-format digital data driver(52, 54a-54c, 56, 58, 36) arranged to operate in a plurality of different display modes(54a-54c), to receive digital input data in a plurality of different formats(3:1 interlace; 5:2 interlace or 3:2 interlace), and to drive data lines( $x_i$ ) of the liquid crystal display(1 or 32) so as to cause an image to be displayed by the display corresponding to the input data; and (b) data analysis means(52 or 64) arranged to receive the digital input data, to determine the format of the input data(3:1 interlace; 5:2 interlace or 3:2 interlace), and to control the data driver(the clock frequency has been changed in a signal driver)(54a-54c, 56, 58, 36) to operate in the display mode corresponding to the format of the input data(see figures 3, 20A, 22A, 26, 27-28; column 10, lines 18-50; column 14, lines 10-50; column 20, lines 13-28; column 21, lines 12-17; column 24, lines 1-10 and lines 54-67; column 25, lines 1-8; column 25, lines 64-68 and column 26, lines 1-21).

As to claim 3, Okumura et al teach data driver is arranged to consume less power in low resolution display(number of pixels in a low resolution display is less than in a high resolution display) modes compared to high resolution display modes(see figure 17, column 14, lines 9-37).

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As to claim 6, Okumura et al teach data analysis means (64) having frame comparison means for comparing each frame of input data with next and determining they are same or not (see figures 10, 28 and column 26, lines 23-49).

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-4, 9-10, 12 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Miyamoto (6,232,951).

As to claims 1-4, 9-10, 12 and 14, Miyamoto teaches an active matrix liquid Crystal display (FLCD, 300) comprising: a multi-format digital data driver (200) arranged to operate in a plurality of different display modes (see column 3, lines 7-25), to receive digital input data in a plurality of different formats (e.g. different resolutions), and to drive data lines of the liquid crystal display (300) so as to cause an image to be displayed by the display corresponding to the input data; and (b) data analysis means (201) arranged to receive the digital input data, to determine the format of the input data, and to control the data driver (the clock frequency has been changed in

a signal driver to operate in the display mode corresponding to the format of the input data(see figures 1-7; column 3, lines 1-53; column 5 lines 19-68; column 6, lines 1-40).

As to claim 3, Miyamoto et al teach data driver is arranged to consume less power in low resolution display(number of pixels in a low resolution display is less than in a high resolution display) modes compared to high resolution display modes(see figure 1 and column 6, lines 16-22).

As to claim 4, Miyamoto et al teach a display modes having at least one 1-bit overlay mode(see figures 2-3 and column 4, lines 48-61).

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 5 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyamoto(6,232,951).

As to claim 5, it would have been obvious to have data

analysis means(201) analyses each frame of input data in turn, and updates the mode of the data driver at the end of each frame since Miyamoto has disclosed data analysis means(201) for updating the mode of the data driver at the end of each horizontal period(see figures 1, 2-3 and column 4, lines 48-61) and frame period is longer than a horizontal period.

As to claim 13, it would have been obvious to have data analysis means(201) having a number of storage registers since the analysis means had to temporality stored video data, display mode information(see figures 1-3 and column 3, lines 49-53).

9. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura et al(5,884,534) in view of Koyama et al(5,767,832).

Okumura et al fail to disclose a data driver for providing a lower refresh rate if the input data has remained uncharged.

Koyama et al teach an LCD display driving circuit comprising data driver for outputting a lower refresh rate if the input data has remained uncharged(see figures 1-2; abstract; column 2, lines 3-10; column 6, lines 53-59). It would have been obvious to have modified Okumura et al with the teaching of Koyama et al, so as to save power(see abstract and column 1, lines 51-61).

As to claim 8. LCD display driving circuit having data analysis means having an OR gate(see figure 2 and column 5, lines 5-31).

10. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura et al(5,884,534) or Miyamoto(6,232,951) in view of Cairns et al(EP 0,930,716).

Okumura et al or Miyamoto fail to disclose a variable bit digital to analog converter.

Cairns et al teach an LCD display driver having a variable bit digital to analog converter(see figures 5, 7, 13-14; column 6, lines 39-58; column 7, lines 1-35; column 13, lines 28-58 and column 14, lines 1-8). It would have been obvious to have modified Okumura et al or Miyamoto with the teaching of Cairns, so as to provide a more efficient digital to analog converter for compensating the non-linearity of optically tenuation versus pixel voltage characteristic of liquid crystal modes of providing analog gray scale(see column 4, lines 9-39 and column 14, lines 3-8).

11. Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura et al(5,884,534) in view of Misawa et al(5,250931).

Okumura et al fail to disclose the driving means and the thin film transistors of the active matrix arranged in the same substrate.

Misawa et al teach an LCD display having driving means(12, 21, and the thin film transistors(29) of the active matrix arranged in the same substrate(11)(see figure 1; abstract and column 4, lines 43-68). It would have been obvious to have modified Okumura et al with the teaching of Misawa et al, so as to reduce the number of connecting wires, ensure more stable connections, minimize space and the number of parts in providing the display control circuitry.

As to claim 16, Misawa et al teach the TFT transistors(29) made of poly-silicon (see column 9, lines 16-34) so to a high speed operation.

***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Zenda(5,111,190) teaches a display having a mode discrimination/clock generator discriminates the polarities of the vertical and horizontal sync signals to determine a display resolution.

Yin et al(5,313,231) teach a video data having one bit of overlay and fifteen bits of true color data(see figures 5-6 and column 14, lines 60-65).

Shimada(5,394,166) teach the power will be reduced when the resolution of the display is reduced.

Lee(5,713,040) teaches a monitor-mode control circuit.

Itoh et al(6,452,579) teach a display apparatus having a change region detector for detecting a change region between a previous frame and a current frame.

Shigeta(6,657,640) teaches an image display apparatus having different resolutions.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lun-yi, Lao whose telephone number is (703) 305-4873.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala, can be reached at (703) 305-4938.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks  
Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

December 4, 2003  
*Lun-yi Lao*  
Lun-yi Lao  
Primary Examiner